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THE BOARDING-OUT SYSTEM.

FORTY years ago or thereabouts, we happened to make a visit to an hospital for pauper orphan children in a large city. It was a dismal spectacle. The little creatures, seated on forms, and dressed in a poor garb, had a woe-begone appearance. Their faces were pallid, and a number of them had sore eyes. The sentiment which arose in our mind was that the whole affair was unnatural, and morally and physically unwholesome. Here was a spacious mansion kept up for the accommodation of some hundreds of poor children whom destiny had deprived of their parents. Treated well, as it was thought, according to regulations, they were evidently unhappy, and pined for that species of freedom which is only to be obtained by children brought up within the domestic circle.

Since that time, so far as Scotland is concerned, there has been a considerable revolution in the matter of juvenile pauper management. The plan of immuring a horde of orphan pauper children in large buildings under the charge of nurses and teachers is pretty generally abandoned, not so much on the score of economy as of common-sense. Nature has clearly ordained that children are to be reared, instructed, and familiarised with the world under the direct charge and responsibility of their parents. That has been the way since the beginning, and it will be so till the end of time. The family system is the foundation of everything that is valued in our institutions. Our whole structure of society rests on it. Any attempt to rear children artificially on a wholesale principle, is necessarily defective, will prove abortive, and be attended, one way and another, with bad effects.

Unfortunately there are exceptions to a sweeping rule. There can be no family system where parents are removed by death, or what is more dreadful, where the parents are so grossly dissolute as to be unfitted for their appropriate duties. In either case arises the question as to what is to be done with children who are so haplessly thrown on public charity. An answer to this brings us to the root of the matter. If at all possible, we must find

foster-parents who will do the duty of real ones to the children assigned under proper precautions to their custody. We are aware that this may not be always practicable, and where it is not, the grouping of children in some kind of asylum must still be perpetuated. Some countries appear to be more favourable than others to the plan of boarding out children with foster-parents. For the plan to have a chance of success, there must be a prevalent intelligence, with a sense of moral responsibilities, and that special condition as concerns means of livelihood which would induce a family to board a child alien to them in name and birth.

In certain parts of Scotland, the plan of boarding out pauper children has been so peculiarly successful, that we purpose to give some account of it. The children so treated are not all orphans; some are children deserted by worthless parents; some are the children of sick, infirm, or lunatic parents; some are the children of parents who are in prison or are convicts. In all cases, deep considerations of humanity have guided the poor-law authorities in dealing with them. Throughout Scotland at 1st January 1875, the number of pauper children boarded out was 4512, among whom there was nearly an equality of boys and girls. The cost of each did not exceed ten pounds per annum; that is to say, for the sum of about four shillings a week a child is respectably brought up in the house of a foster-parent. This sum covers cost of bed and board, school fees, and extras of all kinds. The child participates in the ordinary meals of the family; it goes to the nearest school with its companions, plays about with them, and acquires a knowledge of country life along with a love of natural scenery. Instead of being confined in a dull mansion under a dismal routine of discipline, with the chance of acquiring bad or at least narrow notions, the boarded-out child grows up a stout country lad or lass, and is endowed with such general intelligence as is likely to pertain to the class amidst whom he or she moves. By these means, the boarded-out pauper children cease to be paupers. Forgetting their unfortunate origin, they drop insensibly into the general population. The catastrophe of

orphanism or deserted infancy is robbed of its horrors. Surely, this must be deemed one of the greatest triumphs of humanity.

Of course, the thing could not be done unless under a scrupulous system of management and general supervision. The parochial board, with whom rests the administration, needs to exercise the greatest vigilance in selecting families to whom children may be assigned. Agricultural labourers and small shopkeepers in country villages are, we believe, considered to be eligible, should character and everything else bear investigation. Nor, though boarded out, are the children lost sight of by the poor-law authorities. They are subject to the visits of Inspectors, who report on their condition. In a number of cases, the children are boarded with relatives, who may be supposed to take some special interest in them, and are not disinclined to accept a lesser board than would have to be paid to strangers. Yet the parochial boards do not appear to view with favour the practice of boarding children with relatives who are perhaps aged and infirm, or are in receipt of parochial relief on their own account. The person thoroughly suitable should be in middle life, engaged in active duties, and fit to act the part of a foster-parent. For the success of his endeavours he should be aided in every reasonable way. The child put under his charge must not wear clothes bearing the pauper stamp, but be dressed like the other children in the place. An Inspector reports on the good effects produced by the removal of pauper uniform. 'The hang-dog look of pauperism gradually disappeared from the faces of the children—they saw themselves treated as other children, and soon became as others.'

In the Reports of the Inspectors generally, we have many pleasing instances of the social value of the boarding-out system. The significant fact strongly brought out is that the children do not return to pauperism. 'When they leave school, the boys learn trades or become farm-servants, and the girls go to service like other country girls, and many of them get respectably married. When the children go to service, the family relationship is still kept up, and they return to their foster-parents as other children do to their homes, bringing at term-times, when they get their wages, presents of tea and sugar, articles of clothing, and other tokens of affectionate regard.' We learn that in some cases the children adopt the name of the family with whom they are boarded, and as a rule they are not distinguishable from the younger members of the family. Did our space permit, many valuable particulars could be added. Those who take an interest in this important question in social economics may be referred to an able and handy digest, 'Pauperism and the Boarding-out of Pauper Children in Scotland, by John Skelton, Advocate' (Blackwood and Sons, 1877). The system, it is to be observed, bears no resemblance to that vicious practice of farming-out children, which has been productive of so much demoralisation

and infant mortality. In the boarding-out of pauper children as described in the work of Mr Skelton, and now very general in Scotland, the care that is taken in selecting foster-parents, and the constant supervision to which they are subjected, give to the system its peculiar value. Whether such a system would be applicable to all parts of the United Kingdom is perhaps doubtful. It is at any rate important to know that in Scotland it has been eminently successful, and is the theme of praise by authorities on the subject. The Inspector of the poor of Glasgow tells us that it has been in use in that city for upwards of a hundred years. How suggestive is this remarkable fact—how curious to find that in this as in some other valued public institutions, a thing may flourish and be spoken of approvingly for upwards of a century in one end of Great Britain, and yet be hardly known in another, or if known, be only treated with scepticism and indifference. w. c.

THE LAST OF THE HADDONS.

CHAPTER XXVII.—PHILIP.

I ARRIVED at the Grayleigh Station about seven o'clock in the evening, and walked slowly and enjoyably across the fields, altogether forgetting my dress-troubles as I watched the effects of the red sunset, a more than usually beautiful one. 'I must treat myself to just one look at the dear old beeches, in this light,' I murmured; forgetting fatigue and every other discomfort as I turned from the stile and went down the lane towards the woods. I was standing in mute contemplation of the sunset effects upon the different trees. The air was calm and still; not a leaf moved, as the sunlight stole amongst the majestic trees, crowning one, and robing another from head to foot with its red glory. I was accepting the rebuke with bowed head and clasped hands, when suddenly a sweet, low, girlish laugh—Lilian's laugh—rang out in the stillness, near me.

'There! I told you how it would be. I am not artist enough for that!'

'Try again,' returned a man's voice, clear and strong and in its way as musical as her own.

Whose voice—whose? For a moment I felt as though I were transfixed to the spot where I stood; then with trembling hands, softly parted the thickly covered branches which intervened between me and the speakers. Philip! My heart had already told me that it was he; and one swift glance shewed me that it was the Philip of my dreams—so improved as to bear only an ideal resemblance to the boy-lover I had parted with. He had developed grandly during the nine years we had been separated. Taller and larger in figure, his handsome bronzed face adorned with an auburn beard, whilst his gray eyes retained their old frank kindness of expression, he looked the personification of manly strength, physical and mental.

Impulsively I advanced a step or two, then shyly and nervously shrank back again, clinging to the low outspreading branches of the tree. Presently, when my foolish heart did not beat quite so wildly—presently.

'Yes; that is better. Now a few bold strokes athwart the horizon. Have you not a coarser brush?'

'Yes. I will run in and fetch one.'

'Cannot I, Miss Maitland? Allow me.'

'O no; auntie could not tell you where to find it.' And away she ran, in the opposite direction to where I stood.

Without a moment's pause, in my anxiety for our meeting to take place whilst he and I were alone, I stepped hastily forward. He was examining Lilian's drawing, when he caught the sound of my footstep and looked up. His eyes met mine—ah Philip! ah me!—with the grave calm gaze of a stranger!

I stood utterly powerless to move or speak; and perhaps I looked more than ever unlike my past self in that moment of bitter anguish. But suddenly the truth flashed upon him.

'Great heavens—*Mary!*' he ejaculated, catching me in his arms as I swayed towards him.

I was still speechless; and looking down into my face, he added gently, it seemed to me sorrowfully: 'My poor Mary!'

'Am I so changed as that, Philip?' I murmured in a low broken voice.

'I—I fear you have gone through more than you would allow me to know about,' he replied, reddening. Adding a little confusedly: 'How was it that I did not find you at home, Mary?'

'I did not expect you quite so soon as this,' I stammered out quite as confusedly. 'You said a month or six weeks, and it is only three weeks since I received your letter.'

'I—found myself free sooner than I expected; and of course set my face homewards at once. I arrived at Liverpool last evening, and travelled all night, in order to be here in good time in the morning.'

'Did you get here this morning?'

'Yes; you had only left half an hour or so when I arrived. I should have met you, they told me, had I not taken the wrong turning from the stile.'

'Had—you a pleasant voyage?' I asked, terribly conscious that this was not the kind of talk which might be expected between him and me at such a moment.

I think he was conscious of this also. He stood a moment without replying, then every line in his face seemed to grow set and firm, and he said gravely: 'How is it that your friends here do not know that I have come to claim my wife, Mary?'

'I put off telling them from time to time,' I replied in a low voice; 'but I fully intended telling them this evening.'

'Let us go in at once,' he said hurriedly.

He drew my hand under his arm, keeping it firmly clasped in his own, and we went silently towards the cottage. Lilian was turning over the contents of a box in search of the brush she wanted, and Mrs Tipper was nodding over her knitting, fatigued with her day's exertion. Neither saw us approach, and both looked up with astonished eyes when we entered the room; and without a

moment's pause, Philip introduced me to them as his promised wife.

'We have been engaged for the last ten years,' he said hurriedly, 'and I have just been taking Mary to task for not having told you so.'

'Dear Mary, dear sister, when you ought to have known how much good it would have done us to know!' said Lilian with tender reproach.

'Better late than never, my dear,' cheerfully put in dear old Mrs Tipper, eyeing me rather anxiously, I fancied.

The ground seemed to be slipping from beneath my feet and everything whirling round. I suppose I was looking very white and ill, for Philip gently placed me on the couch, and Lilian knelt by my side, murmuring tender words of love, as she chafed my hands, whilst Mrs Tipper was bending anxiously over me with smelling-salts, &c. But I shook my head, and tried to smile into their anxious faces, as I said: 'I am not given to fainting, you know—only a little tired.'

'The truth is, you have sacrificed yourself for us all this time, and it is now beginning to tell upon you!' said Lilian. Turning towards Philip, she added: 'We have all needed her so much, and she has been so true a friend to us in our time of trouble, that she has forgotten herself, Mr Dallas.'

He murmured something to the effect that he could quite understand my doing that.

'But of course it will all be very different now,' said Lilian. 'It will be our turn; and we must try what we can do to pay back some of the debt we owe to her.—Now, don't look fierce, Mary; it's not the least use, for petted you will have to be.'

'Then I am afraid fierce I shall remain,' I replied, trying to speak lightly.

'That is more like yourself, dear. You are feeling better now, are you not?' asked Lilian.

'O yes, quite well; only a little tired from walking farther than I need have done,' was my reply.

'To think of my talking "*Mary*" to you all day without knowing you were more than friends!' said Lilian, looking up smilingly into Philip's face. 'I know now why you bore the waiting so patiently, and why we got on so well together.—I felt at home with Mr Dallas at once, Mary. I think we both felt that we two ought to be friends.—Did we not?'

He bowed assent.

'And you must please try to like me more than an ordinary friend, Mr Dallas, or I shall be jealous. Mary is my sister, you know, or at least you will know by-and-by; and we cannot be separated for very long; so you must be considerate.'

'Philip knows more about you than you do about him, Lilian,' I put in.

'I am glad he knows about me, of course, Mary; but it will take a little time to quite forgive your reticence about him.—Will it not, auntie?'

'Auntie' thought that forgiveness might just as well come soon as late, in her simple placid way. Then, to my great relief, a diversion was caused by tea being brought in. If Philip had not won the heart of his dear little hostess before, he would have won it now by his hearty appreciation of the good things set before him. I quite understood why, for the first time since Becky had been at the cottage, her mistress had some cause to complain of her awkwardness. Becky's whole attention was concentrated upon Philip; and she placed things

on the table in a somewhat hap-hazard fashion, gazing at him the while with curious speculative eyes.

Afterwards they commenced asking Philip questions about his voyage and so forth; and the conversation became less personal. He gave us an amusing account of his passage, humorously describing the peculiarities of life on board ship. Then as night drew on, Mrs Tipper very earnestly pressed the hospitalities of the cottage upon him. Of course he would be her guest—a room was already prepared, and she knew that she need not apologise to him for its homeliness. She had, I found, arranged to give up her own room for his use, and share Lilian's. But he explained that he was going back to an hotel in town, having arranged to stay there for the present.

'I am afraid I shall very frequently trespass upon your kindness nevertheless, Mrs Tipper. You will only get rid of me by giving up Mary, now.'

At which Lilian laughingly replied, *that* would be paying too dearly for getting rid of him. 'The better way would be to put up with you, for Mary's sake, and so secure you both.'

In truth, Lilian was a great deal more cheerful, I might say merry, than I had seen her for many a long day, in her unselfish rejoicing over my happiness. And the sweet, girlish, modest freedom—the freedom which is so diametrically opposite to fastness—of her manner with Philip, was so pleasant to witness! It was the kind of playfulness which is so charming in a sister towards an elder brother, and which so well became her.

When at length Philip was obliged to take his departure, in order to catch the last up-train from Graybrook, he bade me, in the matter-of-course way which seems so delightful in those we love: 'Come out and set me on my way, Mary; just as far as the stile, if you feel rested enough.'

Yes; of course I felt rested enough. I went out with him into the starlit lanes, walking silently on by his side, happy in the belief that his thoughts also were too deep for words. How could words express my proud humility—the deep tender joy—the love half-afraid of its own strength which I felt! Would he ever know the heights and depths of my love? Would a lifetime be long enough to express it? With it all, I was conscious of a shyness and awkwardness of manner, born of the indescribable feeling which accompanies, and gives a tinge of pathos to, great happiness in some minds. What was I, to be so blessed? What other women find their ideal fall short of the reality, as I was doing? Noble and true as I knew him to be, I had not hitherto, I think, sufficiently appreciated the geniality of Philip's temperament and his keen sense of humour. I do not know whether it was more noticeable in contrast with Robert Wentworth, who certainly impressed one with the idea that he was older than he was; whilst Philip seemed younger than his age. His fine physique too. How very handsome he was, in the best way, and how grandly careless about it! The most cynical observer could not have detected the slightest trace of conceit or self-consciousness in his tone or bearing. In fine, his was the rare combination of physical and mental power. Whilst he possessed the *gaieté de cœur* almost of a boy, an appeal to his intellect would call forth the cool vigorous reasoning of a well-informed thinker.

He had won his way to wealth by dint of intelligence, persistence, and temperate living, in a climate which gives some excuse for, if it does not foster, all kinds of excess, and returned strong in mind and body to reap the fruits of his labour. Moreover, he had not been tempted to continue accumulating wealth for its own sake, nor acquired the huxtering spirit which self-made men so frequently do acquire.

'I think I must not go any farther, Philip,' I said, as we reached the stile. 'You have only to cross the two fields, and turn to the right when you get into the road—that leads direct to the station.'

For a moment he made no reply, and something, I hardly knew what, brought vividly back to my mind the remembrance of another who had stood there on such a night as this, silent beneath the stars—a remembrance which struck upon my happiness as might a sudden sword-thrust upon an enraptured dreamer.

He gathered my hands into his own, and looking down into my face, said in a low earnest voice: 'There can be no necessity for delay between you and me, Mary. When will you let me take you away from here?'

'Take me away from here?' I repeated, rather startled by the suddenness of the proposal.

'I mean, when will you marry me, Mary?'

'We will talk about that by-and-by,' I replied, overwhelmed with happiness again, yet afraid lest I might shew it more plainly than it is womanly to do if I said more.

'Why should there be any delay between you and me? I beg of you not to make any unnecessary delay, Mary. You ought to have been my wife long ago. I know you would prefer a quiet wedding, and—afterwards—wouldn't you like to travel a few months before settling down? You used to have a fancy for seeing some of the old continental towns.'

I could only whisper that it would be very delightful—with him—lowering my head until my cheek rested upon his hand. Then to keep my reeling senses firm, I looked up into his face and made a little attempt at a jest about his not knowing me when first we met.

'Only for a second,' he replied. And even in that light I could see that his colour was heightened. He looked pained too; and I certainly had not meant to pain him. Amongst my failings was not that of the desire to be always trying little wiles to test those I love, as we women are sometimes accused of doing. I had used the words solely in jest and to steady myself.

'Only for a second,' he repeated; adding gently, 'and we will soon have you blooming again, Mary.'

Blooming again! I caught in my breath with a little half-sob. Then making a strong effort, telling myself that I must and would behave better than a love-sick hysterical girl, I lightly replied: 'What if my blooming days are over, Philip?'

He bent lower down, to get a better look into my face, as he said: 'Nonsense! What makes you talk in that strain? It is not fair to me.' Then he added more gravely: 'You have always told me that your friends here are real ones, Mary; and they seem to be very much attached to you. It was very pleasant to hear them talk of you in your absence.'

'They are everything and more than I have described them to be, Philip. Mrs Tipper has been like a dear old mother to me; and Lillian—the best and truest thing I can say about Lillian is, that she is what she looks. No one could be mistaken about Lillian. Hers is the kind of loveliness which takes its expression from the mind.'

'Yes; it is just that. The fellow who could not appreciate her deserves to lose her.' I had given him an account of Lillian's troubles in my letters; indeed he was well acquainted with all that was connected with my life at Fairview. 'I only regret that I was not in England at the time. I suppose it is too late now for'—

'It is too late for any kind of intervention now; but if vengeance is in your thoughts, you may rest content. It will be, I think, quite punishment enough to be the husband of the girl he has married, with the remembrance of Lillian. He certainly loved Lillian.'

'Ah, that is something! When were they married?'

'About three weeks ago,' I told him. And then we got talking over the Farrar history, until the chiming of a distant clock reminded us that he had but twenty minutes in which to reach the railway station, in order to catch the last up-train.

'I shall do it!' he ejaculated; and with a parting word and hurried kiss he vaulted over the stile, and ran across the field, turning once on the way to wave his hand to me.

SUBMARINE CABLES.

LAYING.

BEFORE the days of steam-ships it would have been almost if not quite impracticable to lay ocean cables; for in order to do so with accuracy and success, it is necessary to be independent of wind and weather as far as possible. The course and speed of the ship must be under the control of the navigator, not at the mercy of the winds and currents, so that he may economise cable, and prevent undue strain upon it as the depth varies. Then too it is necessary that the ship should answer swiftly and surely to his will; that she should vary her speed, stop, or turn round, as promptly as he desires. The telegraph-ship is the helot of her cargo, and should be completely subservient to the work of laying the cable. A well-found steam-ship answers all requirements. Up till a few years ago no specially built telegraph-ship existed. The majority of cables have been laid from ordinary iron screw-steamers, fitted with tanks to contain the cable and paying-out gear. Recently, however, the steam-ships *Hooper* and *Faraday* (the first belonging to Messrs Hooper, the other to Messrs Siemens) were specially constructed as telegraph-ships for their respective owners. These vessels are very much on a par in size and carrying capacity. The *Faraday* is a ship of five thousand tons burden, and capable of carrying fifteen hundred miles of main or deep-sea cable. She is fitted with screws both fore and aft, so that her motion can be reversed without turning her in the water. She can thus, without changing her position, begin hauling in a cable which she had previously been paying out. Both of these ships are fitted with three large iron

water-tight tanks for containing the cable—one fore, one amidships, and one aft. The depth of these tanks varies from thirty to forty-five feet, and they are upwards of fifty feet in diameter. The *Hooper* has laid the Brazilian coast cables, and the *Faraday* the Direct United States Atlantic cable. Besides the tanks for holding the cable, the only other peculiarities of a cable-ship, as distinct from other steamers, are the heavy deck machinery for paying out the cable and for picking it up if necessary; the electrical testing-room; and the stock of large iron buoys she carries lashed to her gunwales for use in laying.

The cable-ship having been moored alongside the works where the cable is stored, shipment begins. The cable presents three aspects of increasing thickness, namely the shore-end, intermediate, and main; and thus graduated it is payed out of the tanks in the works into the tanks of the ship. When all is aboard, the tanks are filled with salt-water till the cable is soaked, and the ship puts to sea.

During her voyage to the place from which she is to start laying, electrical tests are taken daily of the cables on board, to see that they continue sound, and the machinery for laying is got ready. The souls on board may be divided into three classes. The *engineers*, or those in charge of the mechanical work of the laying, and their helps 'the cable-hands,' who do the rough work in the tanks and on deck, or in putting out buoys from the ship. The *electricians*, or those in charge of the electrical work of the laying, whose duty it is to see that the cable is all right electrically. The *navigators*, or those in charge of the sailing of the ship, including captain, officers, and seamen. The engineer-in-chief is generally the head of the entire expedition; he requires reports from the chief electrician, and instructs the captain where to put the ship.

Before laying a submarine cable between the proposed places it is extremely important to take soundings and otherwise survey the ocean, so as to determine the exact route the cable should take. A cable is too costly to be flung away anywhere on the sea-bottom, and the sea-bottom is sometimes of a very unfavourable character. It may be said that too little attention has hitherto been paid to this point in cable-laying. Expensive cables have been manufactured at home, with their relative lengths of shore-end, intermediate, and main determined by formula or usage, and then hid away in seas whose character had been largely taken for granted; the consequence being that weighty and very costly shore-end has been deposited in mud soft as butter where it would be out of harm's way; while unprotected main has been laid along the jagged surface of coral reefs. The depth and nature of the bottom, the strength and direction of currents, the temperature at the bottom, should all be ascertained beforehand by a special ship appointed to survey the proposed track of the cable. The best route for the cable is then laid down on the charts, as a guide to the navigator and engineers engaged in the laying.

Great improvements have recently been made in the method of taking deep-sea soundings. The ordinary plan is to carry the lead-line (a strong line or small rope of fine tanned Manila yarn) from the stern along the ship's side to the bows,

and there drop the lead into the sea. As it sinks the rope runs out off the drum on which it is coiled, and when the lead strikes bottom the running ceases. The introduction of fine steel pianoforte-wire for the rope, by Sir William Thomson, is a great improvement upon this clumsy method. The wire sinks quickly through the water, and is pulled in again with a very great saving of time and labour. But the most ingenious of all contrivances for finding the depth of the sea is Siemen's Bathometer, a very recent invention. The bathometer simply stands in the captain's cabin like a barometer, and indicates the depth of the sea over which the ship is passing, just as a barometer indicates the height of the atmosphere above. The action of this ingenious contrivance depends on the attraction of the earth on a column of mercury. This attraction is proportional to the earth's density, and the relative distance of its crust from the mercury column. Earth being denser than water, exercises a greater downward attraction on the mercury. If then there are say a hundred fathoms of water just under the mercury instead of a hundred fathoms of earth or rock, there will be less downward attraction on it. Taking advantage of this law, the mercury column is adjusted so as to indicate the power of the attraction and give the depth of water it corresponds to.

Arrived at the place from which the cable is to be laid, the first thing done is the laying of the shore-end from the ship at her anchorage to the cable-hut on the beach. The cable-hut is generally a small erection of galvanised iron or stone and lime to contain the end of the cable and a few instruments. Cables are never if possible landed in harbours, or where there is danger from anchors. A suitable retired cove is generally selected, not far distant from the town where the telegraph office is, and a short land-line connects the end of the cable to the office. In the cable-hut the land-line and cable meet and are connected together.

The distance from the ship to the cable-hut is accurately measured by the ship's boats or steam-launch, so as to fix the amount of shore-end necessary to reach the shore. This is then coiled in a flat barge or raft, and payed out by hand as the launch tugs the raft ashore. When the water becomes too shallow for the raft to float, the men jump into the water and drag the heavy end ashore. A trench has been cut in the beach up to the cable-hut, and into this the end is laid. In a few moments a test from the cable-hut to the ship announces that the shore-end is successfully fixed.

Everything is now ready for the ship to begin paying out. The anchor has been got up; the paying-out gear is all in working order; the men are all at their appointed places. The cable is being held fast at the ship's stern, and the running out by its own weight is prevented. But directly all are aboard again, the word is given, the screw revolves, the cable is let go at the stern, and the real work of paying out begins.

The cable passes from the tank to the stern of the ship, and from thence to the bottom of the sea. The weight of that part which hangs in the water between the ship and the bottom pulls it out of the ship as the latter moves along. If the ship were stationary, still the cable would run out, but then it would simply coil or kink itself up on

the bottom. The object is, however, to lay it evenly along the bottom, neither too tight nor too slack, so as at once to economise cable, and to allow of its being easily hooked and hauled up again from the bottom without breaking from over-tightness. The speed of the ship has therefore to be adjusted to the rate at which the cable runs out. It should be a little under the rate of the paying out, so that there is a slight excess of cable for the distance travelled over. Now the rate at which the cable runs out from the ship is greater, the greater the depth; therefore the speed of the ship must be varied as the depth changes. The rate at which the cable runs out, however, is not entirely dependent on the depth. It can be controlled on board by mechanism. The cable can be held back against the force pulling it overboard. But there is a limit to the extent to which it may be held back, and the tension on it must not be so great as to overstrain it. It is necessary, therefore, to know what tension there is on the cable at any time. To achieve this, two apparatus are used: the friction brake (for holding the cable back) and the dynamometer (for indicating its tension).

The cable is made to run cleanly out of the tank by being allowed to escape through a funnel-shaped iron framework called a 'crinoline.' This prevents it from lashing about or flying off as the ship rolls. It then passes over pulleys to the paying-out drum, round which it is passed several times. The paying-out drum is controlled by an Appold's friction brake, which is simply a belt or strap of iron with blocks of wood studded to it clasp the periphery of the drum and restraining its revolution by the friction of the wooden blocks. The tighter the belt is made to clasp the drum, the greater the friction on the drum, and the greater the force required to make it revolve. After passing several times round the drum, so as to get a good hold of it, the cable passes through the dynamometer to the sheave or grooved pulley projecting from the stern, and from thence it passes to the water. The dynamometer is simply a 'jockey pulley' riding on the cable; that is to say the cable is made to support a pulley of a certain weight; and according as the tension on the cable, due to the weight of cable in the water, is greater or less, so will the weight of this jockey pulley supported by the cable cause the cable to bend less or more. Although this jockey pulley is the essential part of the dynamometer, there are three pulleys altogether, two fixed pulleys at the same level, with the riding pulley between. The cable passes over both the fixed pulleys and under the riding pulley. The weight of the latter bends the cable into a V shape; and as explained above, the depth of this V is greater as the tension on the cable is less. In short the tension of the cable can be told from the depth of the V, which is therefore graduated into a scale of tensions.

By regulating the friction on the brake the cable can be held back, under restrictions of tension indicated by the dynamometer, and the speed of the ship adjusted to give the proper percentage of slack. Sixteen per cent. for a depth of two thousand fathoms is a usual allowance. The slack should vary with the depth, because of the possibility of having to hook the cable and raise it up from the bottom to the surface to repair it. The revolutions of the drum, the tension on the cable,

the number of turns of the ship's screw, are constantly observed night and day as the laying goes on.

In the electrical testing-room the same watchful activity prevails. A continuous test is kept applied to the cable, to see that its insulating power keeps steady; in other words, to detect any 'fault' that may occur in the cable which is being laid. This is done by charging the cable throughout, from the end on board the ship to the end left behind in the cable-hut, with a current of electricity, and observing on a galvanometer (an instrument described in a recent paper) the amount of electricity which leaks through the gutta-percha from the copper wire inside to the sea-water outside. To shew that the copper wire too keeps continuous from ship to shore, a pulse of electricity is sent along the cable at stated intervals, usually every five minutes. This is either sent from the ship to the cable-hut, or from the cable-hut to the ship by the electricians left on duty there. The resistance too of the copper conductor is regularly taken at times, to see whether the conductor remains intact; for the pulse test only shews that it is continuous, and would not shew, for instance, that it had been half broken through.

The navigators of the ship are meanwhile as busy as the rest on board. It is important to keep the ship as nearly as possible up to the prescribed course marked on the chart, and in any case to determine accurately her place whatever it may be, so that the precise position of the cable on the bottom may be known, in order to facilitate future repairs, if necessary. Observations of the sun and other heavenly bodies are therefore made as often as feasible, and the navigation of the ship very carefully attended to.

If a fault should be reported from the testing-room, the engines are at once reversed and the ship stopped. The length of cable being payed out is cut in two within the ship, and that section still on board is tested first. If the fault is found to be there, a new length of cable is jointed on to the section in the sea, and the laying is again proceeded with. If, however, the fault is in the section already laid, special tests must be applied to locate the fault. If it should be proved to be but a few miles from the ship, she is 'put about;' the end of the section is taken to the bows, where the picking-up gear is situated, and the cable is hauled in slowly from the sea by the help of a steam-winch, the ship going slowly back the way she has come as the cable comes on board. This goes on until the fault is reached and cut out. If the fault should be proved to be twenty or more miles away, the end of the cable is buoyed, and the ship proceeds backward to the locality of the fault. Here she grapples for the cable, hooks it, and draws it up to the surface, where it is cut and the two parts tested separately. The flaw is then cut out of the faulty part and the cable made good. She then returns to her buoy, picks up the end there, joints on the cable on board to be paid out, and continues her voyage.

Arrived at her destination, the shore-end there is landed to its cable-hut. A test taken from there and signals exchanged between the two cable-huts proclaim the completion of her work. It only remains to test the cable daily for a specified period, generally thirty days; and if during

this trial time it remains good and sound, it passes into the hands of the Company for whose use it has been laid, and is then employed for regular traffic and public benefit. In a concluding article we will describe the *working* of submarine cables.

THE ROMANCE OF A LODGING.

IN TWO CHAPTERS.—CHAPTER II.

'WELL, Fred, what will you say to all my sermons on extravagance, when I tell you that I have actually taken the landlady's first-floor rooms for a month; and that without any view to your advantage, which has hitherto actuated my movements? You will say it is only a preliminary step to my employing the artist—who by the way is not an artist after all—to take my portrait!'

Thus did Mrs Arlington announce her plans next morning at breakfast to Fred, who offered no remonstrance. It was enough for him that she chose to do it; he was too well satisfied and accustomed to her guidance and good sense not to fall in readily with everything she did, as the best possible that could be done; and so he assented without a remark.

'You don't scold me, Fred! I expected your reproaches; but they will come later; you are too engrossed at the present moment with the prospect of the examination before you to-day; but I have no fear for you; so have none for yourself.'

'What will you do while I am away?'

'Stay where I am; study the pictures; read the backs of all the books through the glass doors of the bookcase; and think what a churl the owner is to have locked them up. And this amusement over, I shall go in search of a piano; we cannot live for a whole month without one; can we? So I shall order it to be sent on Wednesday morning to our new quarters.'

'Suppose the "gentleman" unlocks his, and sets up an opposition tune; the jumble of melodies will be the reverse of harmonious.'

'Possibly; but then, you phlegmatic youngster, you wouldn't keep me without such a resource, for fear of an occasional discord! Let us hope the gentleman in question will give place to the ladies, and be amiable enough to listen without creating a discord; or he may decamp altogether, if he does not approve of our performances.'

'But tell me what has put it into your head to stay a whole month in London? I thought you said we had only funds for a week.'

'Well, my dear boy, it is just this: I have been thinking that we may as well wait and hear the issue of the examination; as in the event of your being among the successful candidates, of which I have very little doubt, you would be ready to go to Sandhurst without having to incur the double expense of the journey home and back again. Besides, I should like to see the last of you before I sink into my future oblivion, with no further call in the world upon my time and attention beyond writing to you.'

'What nonsense you can talk, mother, when you once begin! I suppose you expect me to believe you are one of the sort that is allowed to go into oblivion. I bet you ten to one some fellow will be wanting to marry you when I am at college!'

'Hush, Fred!' she said, with a solemnity of manner she well knew how to assume, that

effectually quenched any conversation the subject of which she did not approve. 'It is time you started.'

'Forgive me; and good-bye,' he said, with a smile, as he prepared to go.

Wishing him 'God-speed,' she saw him depart, and then rung for the landlady.

'There is no difficulty, I hope, about the rooms?' she asked.

'None whatever, ma'am. I've told the lady; and they leave to-night.'

'Thank you. I wished to know positively before I ordered a piano. I suppose there is no objection to my having one, since there is another in the house?'

'None whatever, ma'am. Leastways Mr Meredith is mostly playing and singing when he isn't reading or painting, or at his meals; so that I am well accustomed to the sound by this time. I like it when he plays lively music. But dear me, ma'am! there are times when his spirits are low, or so I take it to be, and then he plays such dreary doleful tunes, it is for all the world as bad as the Old Hundred on them barrel-organs.'

'He is not married, then?'

'O my! no; not he; nor never likely to be,' she exclaimed, repudiating the idea of losing her lucrative lodger under such unfortunate circumstances. 'His man James says as how he once painted that there lovely faced young creature to remind him that women were one and all as false as— I wouldn't like to offend your ears, ma'am, by naming the unholy gentleman as he likens them to; which I took to be no great compliment to myself, seeing I am a woman as was never false to none, which is saying a good deal, seeing how selfish and tiresome men are, as a rule, that it needs us women to be born saints and angels to put up with them.'

'I am afraid I can't quite agree with you there,' said Mrs Arlington, smiling. 'I rather think we give as much trouble as we get, and a little more sometimes.'

Wednesday morning saw her installed in the rooms above, which she busied herself in arranging tastefully, with a view to making their lengthened sojourn comfortable. Towards evening the piano came, and she was just about to try it, when an unusual bustle below-stairs announced the arrival of the gentleman, Mr Meredith. He was evidently a person of consideration in the eyes of the household; such hurrying to and fro and up and down to have everything as he would like, had not before been experienced.

'Glad to see you home, sir,' said Mrs Griffiths, courtesying, and beaming with pleasure.

'Thank you. Have the rooms been occupied?'

'Yes, sir.'

'I should say you ought rather to be sorry I have come, then.'

'Not at all, sir. I've been able to accommodate the lady up-stairs; and right glad I was that she came when she did, for she has got no troublesome hussy of a maid to come bothering about my kitchen.'

'The same old story, Mrs Griffiths!' he remarked, as he smiled pleasantly at her inability to hide her ruling mania; 'and now please let me have dinner as soon as you can, as I have an engagement this evening.'

He walked round the room, placing his desk and other articles he had brought with him in order; examined his pictures, to see that they had not undergone ruthless treatment at the hands of deputy-lodgers during his absence. After looking at them all he paused opposite the portrait of the young girl, and exclaimed mentally: 'Yes, there you are still, heartless mocker! just as you looked when you defied me and flung back my love in scorn. And yet—and yet—perhaps had I but been a little gentler, I might have softened you!' he cried in remorseful thought as he turned away; and the look of genuine regret he wore shewed how deep had been the wound that had the power still to call up a thrill of pain. 'Yes, I tried to break her proud spirit and make it subservient to mine, and I broke my heart instead! She was but young; I ought to have known better; but I was hard and determined, and could brook no opposition to my will. I had studied life, and established my views on most points, until I grew intolerant—a disease natural to culture as well as creed—and could ill bear to have my opinion questioned, especially by those who aspired to my friendship or affection: it interfered with my visions of harmony. Harmony! It was but a monotonous dreary unison I was cultivating, to foster my intense self-love. Bitter delusion! And from her, above all others, I demanded a slavish bending of her will to mine. I was jealous of her possessing an individuality or free right of being or thought apart from me. I was not content with her affection; I wanted her blind worship. No wonder her proud spirit revolted at such a prospect of bondage, and flung me and my love far from me. She was wise and right, and I was too headstrong to humble myself to sue for her forgiveness, or seek to win her by a nobler course. My heart was a flint, which it needed her loss to soften, for I have never seen another like my darling! Yes, my poor girl, I was unjust and cruel, and Providence was kind to you in rousing you to resist!'

In such a strain did his thoughts run, as he sat waiting for dinner, of which he partook in no very elated mood. When the spirit wanders in the sad lone land of irreparable regret, and surveys with the light of experience how different all *might* have been, had our hearts and wills been differently tuned to action, it is then our footsteps linger, painfully borne down by a weight, well nigh fatal to that courage which bids us bury our dead out of sight, and wander no more amid the graves of the past, but live afresh in the light of a new and better day, with high hope and stern resolve.

Something of this he had done, but not all, for the torment of self-reproach was at times powerful to waste his endeavours in fruitless action or torpid reverie. He was about to sink into the latter at the close of dinner, as, left alone with his coffee and cigar, he sat meditating on the past which he had invoked, when he was startled by the sound of music and the strains of a melody which seemed to float to him across the distant years, and reawaken his heart's sweetest and bitterest memories. Ah! how well he remembered it. It was one he had written and composed for her of whom he had been thinking; and when she sang it to him, he could scarce restrain his tears; but there came a little 'rift within the

lute' one day, that soon 'made all the music mute.' Some slight alteration that she had asked for, jarred upon his sense of its perfection—and his own—and he refused half haughtily, which she resented; words succeeded words, until that was said which could never be forgiven or undone; and then she asked to have her freedom back, and he gave it: yes, he gave it! and had never seen or heard of her after, until now—he hears the echo of the melody; but the voice—"Can that voice be hers?" he cries passionately. Starting up in his chair he listens, with every nerve vibrating to the sound, until it is finished. 'My own song!' he exclaims aloud; and then he rings the bell nervously and summons the landlady. 'Who is your new lodger?' he inquires with assumed calmness.

'Mrs Arlington, sir.'

'Arlington! Arlington?' he mutters. 'Never heard of her. What is she like?'

'A tall sweet-looking lady, sir: I was that taken with I hadn't it in my heart to turn her from the door the night she come here; so I gave her your rooms for a couple of days, for her son and herself.'

'Son! did you say? How old?'

'About sixteen, I should reckon: he has come up for his examinations.'

'No; it is not she,' he thought sadly; 'she could never have had a son so old. But it may be some friend of hers. How else came she by that song, I must find out.—Thank you, Mrs Griffiths,' he said aloud; 'you did quite right to let the rooms; and since she is such a favourite with you, you are welcome to the newspapers for her. Perhaps you had better take them to her every day with my compliments.'

'Thank you, sir; I am sure you are most kind; and I'll tell her what you say.'

'I never will believe, ma'am, half as these good gentlemen say who profess so loud against women-kind. Here Mr Meredith down-stairs, as James says swears against a petticoat even if he sees it hanging in a shop-window, which is most unfeeling-like, to say the least of it—here's he been a begging I'll bring you the newspapers every day, with his compliments!'

'Indeed! That is very thoughtful of him,' said Mrs Arlington, smiling at her landlady's enthusiastic sense of victory. 'Pray give him my compliments, and say how very much obliged I feel. What did you tell me his name was?'

'Meredith, ma'am.'

'Of what family, do you know?'

'That's more than I can say, ma'am. Families, to my mind, is like flowers—a great lot all alike, but divided into so many branches, it were always a puzzle I stopped at. I call a pink a pink, and a carnation a carnation; though the gardener where I lived in service could tell you they were different branches of one family, with a long Latin name, as I never could see not the least bit of good to remember. So I just follow the same plan with families, call them by the names as they hold at birth and baptism; and I only know my gentleman by the label on his box: "Mr Firman Meredith." But if you were pleased to wish to know, I'll ask his man James.'

'Not on any account,' said Mrs Arlington; 'I am not in the least curious; I merely asked for

asking's sake. Give my compliments and thanks, nothing more.'

The newspapers paid their regular daily visit for a week, during which time Mrs Arlington never once touched the piano when she knew that Mr Meredith was at home; although he had purposely remained indoors, hoping he might again hear the song which so roused his memory on the evening of his arrival; but after seven nights of waiting and disappointment, and ineffectual efforts to catch a glimpse of the lady, who did not go out once during that time, he grew so restless and impatient, that in desperation he summoned the landlady once more to his assistance.

'Well, Mrs Griffiths, is your lodger gone or dead? She is a very silent person.'

'O dear, no, sir,' said the landlady, smiling. 'She took the rooms for a month, certain; but she's been suffering from a cold; and the young gentleman has been away most days at his examinations; but he's that quiet you'd never know he was in the house but for his boots.'

'Had she any visitors the first evening I arrived?'

'None, sir. She hasn't told any of her friends, I imagine, that she is here; as it is not to be supposed as how such a well-to-do lady as she seems is without a whole score of friends, as would keep me busy at the door if they only knew where she was.'

'Do you think she objects to visitors then?'

'How can I say, sir? Were you pleased to wish to call?' she inquired somewhat slyly. 'I'll speak to the lady, and find out if it would be agreeable, if you like, sir?'

'Please yourself about that,' he returned with feigned indifference. 'If I can be of any service to her or her son, beyond the newspapers, I shall be happy to call.'

'You are very good, sir, I am sure, and I'll tell her. She was most grateful for the newspapers.'

With a glow of triumph on her face, Mrs Griffiths next morning appeared before Mrs Arlington. It was now her settled conviction that her theories concerning the unreality of the enmity of certain men for women was as 'true as gospel,' to use her own phrase; and as there is nothing dearer to human nature, from the deepest philosopher even to a speculating landlady, than to feel that they have hit upon an infallible vein of truth, her rejoicing was very natural.

She had been planning all the way up the stairs how she might best introduce such a delicate topic with due acceptance, for Mrs Arlington was a lady, she felt, who was not to be taken liberties with; but impulse overruled discretion, and she burst out plumply with the question: 'Would you please to like the gentleman to call? I think, ma'am, for all he feigns to hate us, he's about dying to come up.'

Mrs Arlington fairly laughed aloud at the partnership in the compliment assumed by her good-natured landlady. 'What do you say, Fred?' she inquired, appealing to her son, as though declining the matter for herself.

'By all means have him up. We should be Goths to accept his papers, and say "No, thank you," to himself.'

'You can tell him then, Mrs Griffiths, that we shall be happy to see him this afternoon.'

'You will, you mean,' said Fred. 'You know I promised Cathcart to go out with him, at yesterday's exam., and spend the afternoon upon the Serpentine, after our week's fag.'

'Very well; then I will receive him. *Tant mieux*. I can judge if he is likely to prove a desirable friend for you, Fred.'

With the afternoon came Mr Meredith's servant with his master's card, requesting to know if Mrs Arlington could receive him.

Having granted the permission, her face betrayed unwonted agitation, which it required all her nerve to control before the door opened and he entered. He had advanced half-way up the room to where she stood waiting to receive him, when their eyes met, and flashed one mutual heart-stirring glance of recognition, which she was the bravest to bear, as he started exclaiming: 'Gertrude Bancroft!'

'Firman Meredith!' she cried, but with calmness, for she at least was in a measure the more prepared of the two. They shook hands; nay more; they met as we meet the loved and mourned, after years of parting; and then she whispered, as she held his hand: 'I am Gertrude, but not the proud, soulless, imperious girl whose portrait you have so faithfully preserved. I am now Gertrude Arlington, whose life, I hope, has not been altogether spent in vain. And yet mine was not the whole wrong; was it Firman!'

'No; my poor girl; God knows it was not. To myself alone I take all blame.'

'Nay; I cannot allow that.'

'But it is the truth all the same,' he sighed. 'Had you yielded to my will, I might have slain you with my cruel stony heart; when you resisted, as you must have done, matters might have ended I know not how. Indeed, I might have destroyed you, as surely as he who takes weapon of steel or drops of poison to rid himself of her of whom he has wearied! A merciful God saved you from such a fate, and me from the worse one of causing it.'

'You judge yourself too harshly, Firman; I have no such thought about you.'

'Not so, Gertrude, believe me. There are many gone to their rest who, if they could return, would tell you "he speaks truly:" poor souls, who have gone to their graves thanking God for their release from a life which left them nothing to hope for but death!'

'Then, Firman, there is nothing to regret between us; for across the gulf of precious years, wherein we have each learned so much, we can clasp hands faithfully as truest friends. May I tell you, it was for this I remained; for I recognised the sting I had left in your heart when I saw the pencil sketch of the portrait you had made; and I thought that if we could meet once more, and leave happier impressions than those remaining, it would be wise and right to thus overcome past evil with future good. And now once more you are my friend; are you not?'

'And nothing more! Ah, Gertrude, have you no dearer name to promise me, after all these years of sorrow and loneliness without you?' he pleaded.

'Yes; my whole life shall be yours, if you think I can make you happy,' she murmured; 'but not unless—have no misgivings, Firman.'

'Happy! That is a poor word to express the intensity of my gratitude for this meeting, and

your promise that we shall never part again. Oh! I too have a past to repair, of which I hope your future life may be the witness! You are my Gertrude; and yet, now I look well at you, you are not mine, for your face has altered, and wears a softened look, different from the old Gertrude.

'Let us forget her altogether, and paint me afresh as I am—a woman, who for years has prayed for nought else but what is born of a humble, tender, loving heart. If you find I possess it, then, Firman, our long parting has not been in vain. But now we have much to tell each other of our past lives.'

'I shall feel more interested in planning our future,' he remarked, smiling.

'Ah, well, whatever we may arrange about that, I shall consider it a point of honour not to rob Mrs Griffiths of her pet lodger! It would be base of me to requite the good Samaritan by running off with the ass!' she added merrily; 'so we must keep her rooms for the present.'

'I'll take the whole house, if that is all, and then you will be obliged to stay altogether; for where I am, there you must be also.'

'And I leave it to you to tell Fred, my boy,' she added with a pretty blush, 'for I feel a guilty cheat towards him; he has looked upon me as his mother, I may say, for so many years, I shall seem like a deserter.'

'Say rather you *have* been one, and are now returning to your colours.'

'Strange to say, Fred was struck with the portrait, but found no resemblance to the original.'

'Because you are no longer the same woman; the original has gone.'

And thus were happily reunited for life two who, though severed for a while, had been all along intended for each other—this was the Romance of the lodging.

ROUGHING IT.

THE explorer traversing a hitherto unknown country, the soldier engaged in a campaign, the hunter, the trader, and the settler in the borderlands of civilisation, have every day and sometimes every hour to supply by their own ingenuity needs which for us are satisfied by the simple expedient of sending to a well-stocked shop for what we require, or calling in a skilled workman to do a job for us. Accustomed as we have been all our lives to procuring our bread and meat from the baker and butcher, sleeping every night in comfortable bedrooms, trusting for protection to 'Police-man X' and his brethren of the blue coat and helmet, and making our journey by rail at fifty miles an hour—we can hardly realise the position of a man who is thrown on his own resources for food and shelter in a wild country, where perhaps his road lies over scorched plains or through dense forests. Yet if he only knows how to set about it, such a man can live and travel or do his work in comparative safety and comfort. Even on his own ground the uncivilised is inferior to the civilised man, for the latter has learned or can learn from the savage all that is most useful in a wild country, and can add this local knowledge to the resources which civilisation has placed at his command. His

natural physical powers are generally superior to those of an uncultured people, and he can supplement them by aids derived from art. What is the piercing sight of an Indian or an Arab scout to the power of a good field-glass or telescope? And in the chase or the fight the assegai or the flint-lock musket stand but a poor chance against the rifle. Moreover the savage knows only a few shifts or 'dodges' peculiar to his own people; but the explorer has at his command at once the arts of civilisation and those of hundreds of uncivilised tribes. He learns from the Eskimo to traverse the snow on snow-shoes, or make long journeys with the dog-sledge; he takes the canoe of the Indian, and the Malayan outrigger; he can build a half-buried hut like a Tartar, or a palm-leaf cottage like a negro; he learns from the Guacho to stop a wild-horse with the lasso; and in the pursuit of game, the traditional lore of the trappers and hunters of every land is at his service. If he is strong, active, and hardy, and can use a few tools, he can learn in this way a hundred 'shifts and expedients,' either from oral instruction, or from books such as that which lies before us: *Shifts and Expedients of Camp Life, Travel, and Exploration*. By W. B. Lord, R.A., and T. Baines, F.R.G.S. Field Office. (30s.)

We have seen other works of the same kind, but none so complete as this. To the explorer, the soldier, the settler, and the missionary, it will be invaluable; and even stay-at-home people who lead an active life in the country, will gather many valuable hints from it. To all it will be of interest, on account of its numberless anecdotes of successful struggle with difficulties of every kind, sketches of the arts and customs of uncivilised man, and notes on the topography of many lands and the natural history of their winged and four-footed inhabitants. Here we are told how to set about building a boat of wood or skin; how to make a birch-bark canoe; how to repair a broken axle or wagon-wheel; how to cross a bridgeless river; how to build a hut or pitch a tent; to picket horses and secure camels; to trap wild beasts or snare birds; to find a dinner where there are no shops, and to cook it without a kitchen. These are a few of the many subjects treated by our authors, who are themselves veteran travellers and explorers, and have learned in the field much of the knowledge which they here communicate to others.

It would seem that one of the chief difficulties in organising an exploring expedition is to decide upon the stores and provisions to be carried. If there is not enough of these, the party may be crippled far from its base of operations; if there is too much, its movements will be seriously impeded by the necessity of transport. Much depends upon the nature of the country. One of the Australian expeditions which had to traverse districts where food of all kinds was scarce, had to carry an enormous amount of stores, the first item in the list being seventeen thousand pounds of flour; but

then the party consisted of twenty-one men. Generally an explorer is in the best position who can start off with only one or two white followers, the rest of his party being hired natives, well used to the ways of the country; and we believe the most successful explorers have been those who, as far as white men are concerned, have worked alone or almost alone. Livingstone's success is a good proof of this. Mr Lord suggests that in countries where riding is practicable, explorers should make up their minds to eat horse-flesh occasionally, and start with a good train of pack-horses, each horse being shot and eaten as soon as its burden is disposed of. He does not appear to have ever tried the plan himself; and we fear that at the end of a long march the flesh of a hard-worked pack-horse would be a very poor substitute for roast-beef. It is a pity that oxen cannot be used as pack-animals. They are turned to a stranger purpose in South Africa, where the Hottentots and Kafirs saddle and ride them; and one of the authors of this book of travel tells us that he has more than once had a very comfortable ride on one of these horned steeds.

The Tartars use dogs to carry packs; in the far north they do the chief work in pulling the sledges, though the Laplanders chiefly use the reindeer for this purpose. The Eskimo sledge-dogs are fine strong animals, nearly allied to the wolf; and Messrs Lord and Baines give some amusing hints about their management. The sledge-driver must never leave his sledge without securing it to a spear driven into the snow, or the dogs will perhaps start off of their own accord and distance all pursuit. They are very quarrelsome; but generally in every team there is one master-dog, with a very determined will and strong sharp teeth; and when he sees the others fighting, he will dash in amongst them, and vigorously assist his master in restoring order. When rough ice is to be traversed, the dogs' paws are protected by little bags or moccasins of hide. They are not fed till the day's work is over; and great care has to be taken that each gets his proper share, for 'some are so desperately artful and cunning that they do all in their power to delude their master into a belief that instead of having had their full allowance, it is yet to come.' The Lapland sled or *kerres* is different from the low flat Eskimo dog-sledge. It is shaped something like a big shoe, and is drawn by the reindeer, which is used in the same way in Siberia, and also for riding and carrying packs. In many countries summer sleds are used. One of the easiest to make is formed of a forked branch, with pieces of wood nailed across the fork, the horse or mule being harnessed to the pointed end. This is often used by the settler for dragging loads of all kinds over level ground.

These forked branches and sticks can be turned to an endless number of uses. Grindstones are mounted between them; they form yokes for hanging weights over the shoulders; hooks for suspending small objects in the hut or tent; racks for arms and harness. In many countries the native plough is formed of two forked branches tied together and dragged by one man, while another holds it down, and thus scratches a furrow in the ground. The frontier settler has sometimes to be content with a similar contrivance, made on

a larger scale, of bigger branches, and drawn by a couple of his oxen.

Some of the architectural 'shifts' are very interesting, for there is a wide field for ingenuity in the construction of hut and boat. In the tropics, huts are very easily constructed by building up a framework of poles, branches, or bamboos, the sticks being not nailed but lashed together where they cross; this rough outline of walls and roof is then filled in with mats, bundles of rushes, or the broad leaves of the fan-palm. Another method is to build the hut of slabs ingeniously formed out of a very unpromising material—long reeds. A few sticks are cut and laid parallel to each other on the ground; then across these a thick bed of reeds is carefully arranged; another stick is laid on this bed, exactly over each of the sticks below; the projecting ends of each pair of rods are then tied together; and the solid mass of reeds thus secured can be raised on its lower edge and supported by props or by other slabs meeting it at an angle, much as children build houses of cards. In this way very serviceable stables and outhouses are often made in India. Having erected his light hut or pitched his tent, the traveller, if he is making a prolonged halt, proceeds to furnish it. Planks and boxes supply seats; and if there is a pole in the centre, a serviceable table can be made by fixing a wagon-wheel on it about two and a half feet from the ground, the pole passing through the centre of the wheel, and the spokes being covered with a few small boards. A comfortable bed is easily improvised. Livingstone had a new one made every night under his own supervision. This was his plan. First, he had two straight poles cut, two or three inches in diameter, which were laid parallel to each other at a distance of two feet apart; across these poles were placed short sticks, saplings three feet long; and over these was laid a thick pile of long grass; then came the usual waterproof ground sheet and the blankets. 'Thus,' writes Stanley, 'was improvised a bed fit for a king.' The wagon used by the colonists at the Cape is very like a long hut on wheels, and forms a very comfortable sleeping-place; while a large tent can be made by halting the wagon, driving in a few poles near it, and stretching the tent canvas from these to the wagon-roof. It has been proposed too that this roof should be an inverted boat of waterproof canvas, which could be removed at pleasure and used in crossing rivers. The wagon is so large that this seems to be quite a practicable idea.

Every explorer and traveller must carry some kind of a boat or canoe with him. If he is without one, the natives will often make most extortionate demands for the hire of their own to him; but if he has one, no matter how small, he can bargain on much more equal terms. But even if no boats can be procured, the mere crossing of a river can always be effected by means of rafts. These can be made of almost anything; casks, boxes, planks, reeds, bamboos, all can be pressed into the service; but we are told, it must be borne in mind 'that the cargo a raft can carry above water is always small, and not at all like the mountain of treasure invariably represented on that of Robinson Crusoe.' These rafts are often constructed of very strange materials. On the Nile they are made of jars, which are thus brought down the river to be sold at Cairo. On many of the African rivers they are

made of bundles of sedge-grass; and lying down on these, the hippopotamus hunters approach the huge beast; the raft looking so like a natural accumulation that he does not attempt to get out of the way till it is too late. On such a raft, made on a larger scale, the Swedish naturalist Lindholm and his assistant successfully descended one of the rivers that feed Lake Ngami. The voyage was a strange one. The raft was built in a quiet nook by throwing hundreds of bundles of sedge across each other, without any other fastening than their natural cohesion and entanglement. On this huge floating mass a hut was built, and the two adventurers then poled it out into the stream, and it went down the current at the rate of about forty or fifty miles a day. Occasionally it took the ground at the bottom, but when a little of the grass tore off, it floated clear again. As the lower layers became sodden and pressed together, fresh grass had to be cut every day and laid on top, till at last there was six feet of the raft under water. Occasionally overhanging branches tore off some of the grass, and once a large projecting trunk lay so close to the water that it 'swept the decks fore and aft.' The hut was destroyed, and with much of its contents was carried away into the river; but the travellers saved themselves by climbing over the bough, and then repaired the damage and resumed their voyage. Sir Samuel Baker constructed a much more singular raft to cross the Atbara River in Equatorial Africa. A bedstead supported by eight inflated hides formed the basis of the structure; and on this was secured a large sponging bath three feet eight inches in diameter, which formed a dry receptacle for the ammunition and other baggage.

One of the most remarkable features of uncivilised life is the power savages shew of tracking men and beasts over immense distances. Many travellers have spoken of this as something almost miraculous, yet it is only the result of careful observation of certain well-known signs; and we have here before us a collection of very common-sense hints on the subject. In countries like ours every trace of foot-print or wheel-track on roads and paths is soon obliterated or hopelessly confused; but it is otherwise in the wilderness, where neither man nor beast can conceal his track. In Kaffirland, when cattle are stolen, if their foot-prints are traced to a village, the headman is held responsible for them, unless he can shew the same track going out. A wagon-track in a new country is practically indelible. 'More especially,' say our authors, 'is this the case if a fire sweeps over the plain immediately after, or if the wagon passes during or after a prairie fire. We have known a fellow-traveller recognise in this manner the tracks his wagon had made *seven years before*, the lines of charred stumps crushed short down remaining to indicate the passage of the wheels, though all other impressions had been obliterated by the rank annual growth of grass fully twelve feet high.' Sometimes the original soil being disturbed, a new vegetation will spring up along the wagon-track, and thus mark out the road for miles. Even on hard rock a man's bare foot will leave the dust caked together by perspiration, so that a practised eye will see it; and even if there is no track, a stone will be disturbed here and there, the side of the pebble which has long lain next the ground being turned up. If it is still damp, the man or beast

that turned it has passed very recently. If a shower of rain has fallen, the track will tell whether it was made before, during, or after the shower; similar indications can be obtained from the dew; and another indication of the time that has elapsed since a man passed by is furnished by the state of the crushed grass, which will be more or less withered as the time is longer or shorter. Other indications are drawn from the direction in which the grass lies; this tells how the wind was blowing at the time the grass was crushed; and by noting previous changes of the wind, one learns the time at which each part of the track was made. Much too can be learned from the form of the foot-prints. Savages generally turn their toes in, in walking; white men turn theirs out. A moccasin print with the toes turned out would indicate that a white man in Indian walking-gear had gone by; and almost every foot has a print of its own, which enables an experienced tracker to follow a single track amongst a dozen others. Similarly the character of the print will tell whether the man who made it walked freely or was led by others; whether he was in a hurry or travelling slowly; whether he carried a burden; and if he were sober or tipsy. A horse-track is equally well marked. It tells when the horse galloped, where he walked, when he stopped to feed or drink; and a scattering of sand and gravel will tell when he was startled by any strange sight. In all this two things are needed—sharp sight and careful training. The elephant often makes a very curious track as he walks; if he suspects danger, he scents the ground with the tip of his trunk, and this makes a well-marked serpentine line in the dust. Elephants have changed their tactics since rifle-pits were introduced. Formerly, when their chief danger was a pitfall, the leader of the herd felt the ground inch by inch; and if he detected the covering of a trap, tore it off and left it open. Now they rely much more on scent, and in this way, often from a great distance, detect the hunter lurking near their drinking-places. If so, they will sometimes travel fifty or a hundred miles to another stream or pool.—Such is a specimen of this generally amusing book.

FANCHETTE, THE GOAT OF BOULAINVILLIERS.

AN EPISODE OF THE SIEGE OF PARIS.

WHILE the German army inclosed in its iron grasp the most brilliant and pleasure-loving city of Europe, transforming in a moment its epicurean population into a people of heroes, the environs once so gay and so beautiful had experienced a change almost as great. Most of the detached villas were deserted, or occupied by the enemy, and the villages whose regular inhabitants had either taken refuge in Paris or fled to a distance, were repopulated by a singular assemblage of individuals belonging to all classes of society, and bound together only by the tie of a common nationality, and the necessity of finding a shelter and providing for their daily wants.

The hamlet of Boulainvilliers, which had been thus abandoned, had received an entirely new colony, and its beautiful avenue carpeted with turf of the most lovely green, had all the appearance of a camp. As long as the season would permit,

cooking was carried on in the open air, and groups were constantly to be seen surrounding the fires and exchanging accounts of their mutual misfortunes.

A painter of Fleurs, bearing the English or rather Scotch name of MacHenry, was among these refugees. He had brought with him from Colombes, where he had before resided, a remarkably beautiful white goat called Fanchette. This creature, to which her master was much attached, figures in the most of his pictures. Light and graceful as a gazelle, she is represented sometimes cropping delicately the green branches of the hedgerows and bushes, sometimes entangled in a maze of briar-roses, their pink blossoms and green leaves falling around her in elegant garlands, and contrasting well with the snowy whiteness of her skin.

Fanchette was a universal favourite; and few there were at Boulainvilliers who would not have deprived themselves of a morsel of the bread sometimes so hard to procure, that they might reserve a mouthful for the goat, which, however, the saucy thing would only accept from her particular friends.

The grace and rare intelligence of the animal frequently relieved the miseries of the siege. All were surprised at the wonderful education her master had succeeded in giving her. He had even taught her something of his art; and it was really extraordinary to see the sensible creature busily employed in arranging pebbles on the ground, so as to form a rude resemblance to a human profile, often grotesque enough, but still such as one occasionally sees on human shoulders; and looking at her work, one could not help thinking that after all the *lower animals* are perhaps not so far inferior to us as we suppose.

The art with which Fanchette selected from a bunch of flowers each one that was named to her was really marvellous. Roses, wallflowers, tulips, camellias, were promptly chosen from the number, and it was rare indeed that she made the least mistake. Two centuries ago they would have burned the poor beast for a witch.

The exercise which she preferred to all others consisted in catching on her horns a series of brass rings which her master threw up in the air. This she did with the greatest address; and when she had got a dozen or so of them encircling her brow like a diadem, she would begin jumping and galloping and shaking her head to make them jingle, till, over-excited by their rough music, she would end by dancing in the most fantastic style on her hind-feet, till tired at length with her exertions, she would bound towards her master and throw the rings at his feet.

Among those who had found refuge in the hamlet was a child of five years old, called Marie, the daughter of a peasant whose farm had been burned by the invaders. She was an object of general interest in the little colony on account of her gentle manners, and the sweet but suffering expression of her pale infantine features. A year or two previously she had been so severely bitten in the arm by a vicious dog that the limb had to be amputated, and her delicate constitution had never recovered the shock. Fanchette soon took a great fancy to the little girl; and the doctor having advised her to be fed as much as possible upon milk, MacHenry offered that of the goat. It was beautiful to see the pleasure with which the affec-

tionate creature took upon herself the office of nurse, and the avidity with which the child sucked in the grateful nourishment which was giving her new life. Fanchette became every day more and more attached to Marie. She rarely left her, except when wanted by her master for some new study; and when it was ended, and MacHenry set her at liberty, saying: 'Now be off to Marie,' with what joy the creature bounded away, and how rejoiced was the little one to have again by her side her darling Fanchette! Nestling her head under the child's hand, a world of loving things were interchanged in their mute caresses.

It once happened that a lady having in her hand a crown of artificial ivy which she had picked up somewhere, probably the *débris* of a school *fête* during happier times, placed it on the head of the little Marie. Fanchette, rising on her hind-legs, examined it with comical curiosity; and having made up her mind on the subject, scampered off to an old tree close by, around whose trunk the real ivy twined in thick and glossy wreaths, butted at it with her horns, twisting it round them, and tearing off long trailing garlands. She then ran back in triumph to throw her treasures at the child's feet, saying as clearly as if she had the gift of speech: 'Look! This is better than the coarse imitation they have decked you with; this is the real thing!'

Another day the child was looking at herself in a mirror, and Fanchette immediately began to do the same. The expression of sadness and wonder in her eyes seemed to say so plainly: 'Why are Marie and I so different? If I were like her I could speak to her, and then we should love each other still better!'

One evening Marie, who was sitting by her mother's side, began to fidget and complain of an uneasy sensation in her back. Her mother, busily engaged with some work, and thinking the child was only disposed to be troublesome, examined it slightly, and told her to be quiet; but the poor little thing continued to complain, when, the mother getting out of temper, gave her a sharp slap. Fanchette, who was present at this scene, presented her horns in a threatening attitude to the woman, and gently stroked the shoulders of her little friend with her foot. At the sight of the dumb animal's eloquent appeal, the woman began to relent, and calling the child to her, examined more carefully the state of things, when she found, to her horror, one of those large and poisonous caterpillars called in French '*processionnaires*,' which had painfully irritated the delicate skin of the child.

It was about this time that MacHenry, continuing his artistic labours in spite of all the difficulties of the situation, resolved on taking for the subject of a new picture his goat Fanchette nursing the little Marie. Fanchette lent herself with her usual intelligence and docility to his wishes; and Marie was represented lying among grass and flowers with her four-footed friend bending over her. This picture, which was afterwards regarded as one of MacHenry's best works, obtained the most signal success at the Paris Exhibition of Modern Art—the truthfulness of the design, the freshness of the colouring, and the grace of the composition being equally striking.

But these bright autumn days soon passed away, and many may recollect the bitter cold of the sad

Christmas of that dismal winter. Poor little Marie suffered so severely from it, that after a vain attempt to recall some warmth by lighting a fire of brushwood, the only fuel that could be procured, her mother, as a last resource, put her into her little bed, in the hope that by heaping upon her all the clothing she could procure, the child might regain a little heat; but it was in vain: no heat came, and the blood had almost ceased to circulate in her frozen limbs. At this moment Fanchette arrived, and without waiting for an invitation, sprang upon the bed. It was in vain they tried to drive her away; she only clung the closer to her nursing, and covering the child with her body, soon restored her to warmth and animation.

There was one among the temporary inhabitants of Boulainvilliers for whom Fanchette entertained an unmitigated aversion; this was a knife-grinder of the name of Massicault. His appearance was certainly not calculated to produce a favourable impression, for his features were repulsive and his expression disagreeable. A low forehead, a scowling eye, and a short thick-set figure were the principal physical traits of this personage; nor were they redeemed by those of his moral character. He had for his constant companion a large ill-favoured bull-dog with a spiked collar, who seemed to share all the evil instincts of his master. Every one wondered how the knife-grinder managed to feed this animal at a time when it was so hard to find the merest necessities of life for human beings—and that too without ever seeming to do a hand's turn of work; for all day long he was lounging about, and it was rare indeed to hear the noise of his wheel. When any one—alarmed at the threatening aspect of the brute, who never failed to growl and shew his fangs when approached—asked his master to call him off, Massicault used only to reply with an ill-natured laugh: 'He has not begun yet to eat such big morsels as you; but there's no saying what he may do one of these days!'

MacHenry was sorry that his goat partook of the general dislike to this man. He would have rather wished that she should have tried by her winning caresses to soften his rugged nature, and bring him to love the gentle creature that had gained all other hearts; but as we shall see in the sequel, things turned out very differently.

On one of the last fine days of that sad year, a crowd having gathered round her while her master was amusing himself by exhibiting her intelligence in the selection of the fruit and flowers he named, in which she acquitted herself with her usual sagacity, MacHenry bade her fetch an apple. There were some still hanging on a tree in a neighbouring garden; but instead of running off as usual to the well-known place, she went right up to the knife-grinder, and pushing aside with her paws the skirts of his coat, displayed two pockets stuffed with something, which the crowd, amid shouts of laughter, declared to be stolen apples. The artist tried to call off his goat, and the man drove her away with curses; but two vigorous peasants immediately laid hold of him, and insisted on seeing the contents of the suspicious pockets; which proved to be, as all had supposed, apples stolen from the tree in question. The discovery only increased the rage of Massicault, who swore with the most fearful oaths that he had never touched one of them, and that the

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apples found in his possession had been given to him by a friend. Though none believed him, several, in order to get rid of a disagreeable affair, feigned to do so, and he was finally let off; but many thought they had thus got a clew to the authorship of several robberies recently committed to the prejudice of different members of the little community.

This misadventure excited in the knife-grinder a violent hatred against Fanchette, which was heartily shared by his worthy companion the bull-dog. The latter was an object of special terror to poor little Marie. Fanchette seemed to understand the fears of the child, and whenever the dog approached her, she would lower her horns, as if to protect her nursing and defy her enemy. These demonstrations of valour were generally successful, the dog slinking off with glaring eyes and drooping tail.

One day Fanchette nestled up close to her master, putting her foot upon his arm, and having succeeded in gaining his attention, ran off to a particular spot, where she stopped to sniff the grass, and then trotting back, she renewed several times the same manœuvre. MacHenry, persuaded that something extraordinary must be the matter, rose and followed her. When she reached the spot, putting aside like a terrier dog the long herbage with her feet, she displayed to view a leather pocket-book, which the artist picked up and examined. An instant sufficed to shew that it belonged to the knife-grinder, and its contents proved that this man was one of the numerous spies the Germans had constantly and everywhere in their service. He found besides in this pocket-book, pushed under the covering, the picture of a child, one of those common photographs which have no other merit than a certain resemblance.

The very day that this pocket-book was found a frightful scene took place. Little Marie was sitting on a low stool eating a morsel of bread, which she was sharing with Fanchette, when the bull-dog chanced to pass. The animal stopped for a moment, and looked at her; then as if overcome by the temptation, he suddenly darted at her and snatched at the bread. He was prevented, however, by the goat, and with a toss of her horns she sent the ferocious beast sprawling to some distance; but he was only stunned, not seriously hurt; and furious at his repulse, he sprang upon the poor goat, seized her by the throat, and shook her with rage. Marie uttered piercing shrieks, and MacHenry having got hold of a stick, ran to the rescue. A sharp blow on the head caused the dog to lose his grip of poor Fanchette, and turn against his new enemy, seizing him by the shoulder; but a peasant coming to the assistance of the artist, forced the dog again to let go; and limping off and growling, he at last took refuge beside his master, who all the while had been an unmoved spectator of the scene.

Great was the general grief at the sight of poor Fanchette motionless on the grass, bleeding profusely from the wound in her throat; and strong the indignation excited by the ferocity of the dog and the conduct of its brutal master. Many were the threats muttered against both; and there is little doubt that the dog at least would soon have paid the penalty he deserved had Fanchette's wound been mortal; but on examination it was found to be less serious than it appeared, and her

master's care of her soon effected a complete cure. The inhabitants of the hamlet, however, resolved not to let slip the opportunity for getting rid of the obnoxious knife-grinder. This ill-favoured individual was received whenever he shewed himself with cries of 'Be off and quickly too, and be thankful we do not throttle your wretch of a dog first.'

Unable to resist the general storm of indignation, the man and his worthy companion were about to take their departure; but they had hardly reached the entrance of the village, when they were met by a party bringing along with them an orphan boy of about six or seven years of age, whose parents had been found murdered some days previously in one of the detached cottages of the neighbourhood, which some still ventured to inhabit. The child, at the sight of the knife-grinder and his dog, uttered a loud cry and covered his eyes with his hands.

'What is the matter, my poor little fellow?' asked one of the by-standers. At length he was able with difficulty to reply, his words interrupted with deep sobs: 'That man! that dog! It was they that killed my mother! I saw it all from behind the curtain in which I was hid.'

Every one looked in astonishment at his neighbour, not knowing whether to believe the strange assertion of the child; when MacHenry produced the pocket-book and informed those around him of its contents. The child immediately cried out that it was his mother's; and had any doubt remained it would have been dispelled by looking at the portrait that was contained in it, for its resemblance to the poor little boy was striking.

In presence of such proof, there could be no hesitation, and two men immediately set off in pursuit of the fugitive; but he had already got a considerable advance, and fear lent him wings, so that before they could reach him he had gained the protection of the German outposts. He did not succeed, however, in evading the fate he merited, for shortly after the news arrived that the wretched man had fallen into the hands of a detachment of French *francs-tireurs*, and having been convicted of being concerned in the burning of a farm, was immediately condemned and shot.

MacHenry adopted the orphan boy, and never had cause to repent of his generous action. 'I have now two children,' he used gaily to say; 'for my gentle intelligent Fanchette is almost as dear to me as if she were a human creature!'

LIME-JUICE.

SOME interesting facts have been communicated to us, arising out of the publication of our recent article on 'Lime-Juice' (March 24, 1877). It appears that some years ago Messrs Sturge of Birmingham established a Company for developing the resources of the island of Montserrat in the West Indies. Attention was directed chiefly to the production of genuine lime-juice, mainly for the extraction therefrom of citric acid, of which Messrs Sturge are extensive manufacturers in this country. With this object in view, they paid sedulous attention to the maintenance of extensive lime-tree plantations. All the ripe sound fresh fruit is selected first, for the production of lime-juice, while the remainder becomes available for citric acid. The juice is bottled.

immediately on its arrival in this country. In 1874 the Company were the owners of no less than five hundred lime-trees in full bearing in the little island of Montserrat; and the number has since been increased by the conversion of unprofitable sugar-plantations into profitable lime-tree plantations. The collection and manipulation of the ripe limes give healthy employment to large numbers of women and young persons.

When Dr Leach, medical officer on board the *Dreadnought*, called public attention in 1866 to the recent appearance of scurvy in merchant-ships, he induced the Board of Trade to take up the matter seriously. This led to the passing of an Act in 1867, ordering the provision of lime-juice or lemon-juice in every merchant and passenger ship, and its use every day by every person on board. It is, however, known that lemon-juice is not so effective as lime-juice as an anti-scorbutic; and that, moreover, the best lime-juice does not require to be 'fortified' with ten or fifteen per cent. of alcohol to preserve it, which appears to be necessary for lemon-juice and inferior lime-juice. In the navy more strictness is observed. Lime-juice *only* is permitted; it must be prepared from ripe sound fruit, gathered in particular months of the year; and must bear analytical tests touching its citricity, flavour, and condition. As a consequence, scurvy is now almost unknown in the royal navy, except in the case of the recent Arctic Expedition, the particulars of which will no doubt be fully investigated and set forth by the Admiralty Committee duly appointed for that purpose. The navy is, we believe, supplied invariably with the best lime-juice only, to the exclusion of lemon-juice, and also to the exclusion of such juice of the real lime as requires, on account of its poorness of quality, to be fortified or 'doctored' with strong crude spirit. Very likely, in this as in so many other instances, cheapness is at the bottom of the whole affair: mercantile lemon-juice (even if called by the name of the lime) being cheaper than navy lime-juice. If so, it affords a sad instance of the misuse of the good word economy; for it certainly is not economical to imperil the health of the crews in trading-ships, and of passengers in emigrant-ships, by the use of that which is 'cheap and nasty.' Something there is in the common juice which renders it very unpalatable to the men, who often shirk their prescribed dose unless strictly watched. Let us hope that the Report of the Arctic Committee will strengthen the hands of the Board of Trade to deal with this matter.

AFFECTION IN BIRD-LIFE.

A CORRESPONDENT having read our recent article on Bird-affection, kindly sends us the following singular instance of intelligence and affection on the part of a duck. 'We have,' he tells us, 'two white ducks; the one designated Mr Yellowbill being wonderfully intelligent, yet fond of fun. My little son and he have great games together. The lad throws out an india-rubber ball a longer or shorter distance, leaving it for the bird to decide whether it shall be pursued with a flying or a running movement. In either case, the ball is swiftly seized by duckie, and returned to the thrower, who keeps up the game until both have had enough of it. Another peculiarity of Mr Yel-

lowbill may be mentioned. At the splashing of water from an adjacent well he is aroused, and will instantly fly towards the scene of action, plunge in, bathe, jump out, flap his wings joyfully, and "like a bird," take himself off again. But the story of affection for his kind must now be told. The other day, when swinging on a gate, my little boy felt something tugging at his trousers, and on looking round discovered the duck, who, he supposed, invited him to a game at ball. So down he got, and caressed his feathered friend as the preliminary. The duck, however, continued pulling away in so unusual and persistent a manner that the lad decided to go whither he was led; and lo! at the corner of an outbuilding was found poor Mrs Yellowbill, lame of a leg and quite unable to waddle along. Meanwhile her husband continued to manifest the greatest concern about her, yet did not forget his manners and grateful acknowledgments, but bowed and better bowed to those around who had now come to the rescue; shewing that even a duck may act and feel as a gentleman. The cause of hurt referred to has not been ascertained; but happily Mrs Yellowbill is now quite well, and her husband is as lively as ever.'

LENACHLUTEN,

A WATERFALL IN ARMYLSHIRE.

'Mong crags where the purple heather grows,
'Mid rocks where blooms the mountain rose,
Onward the river calmly flows

To Lenachluten.

The waters dash on the rocks beneath.
In a mad wild rush, they surge and seethe,
While dancing spray with a snowy wreath
Crowns Lenachluten.

Thus ever the stream of life flows on,
With faces happy and faces wan,
A moment here on this earth, then gone,
Like Lenachluten.

Some lives pass on like a peaceful dream;
Untouched by sorrow or care, they seem
To glide as the river whose waters stream
Towards Lenachluten.

Others career on their restless way;
Whate'er betide, they are ever gay,
As gleams the sparkling sunlit spray
On Lenachluten.

Some lives with folly and sin are fraught;
They dim earth's beauty with stain and spot,
As surges the scum, an ugly blot
On Lenachluten.

And now and again a genius bright
Dazzles the earth with his spirit's flight,
As shimmers the rainbow's tinted light
O'er Lenachluten.

H. K. W.

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